



## Altitudinal patterns of tick and host abundance: A potential role for climate change in regulating tick-borne diseases?

**Author(s):** Gilbert L  
**Year:** 2010  
**Journal:** Oecologia. 162 (1): 217-225

### Abstract:

The impact of climate change on vector-borne infectious diseases is currently controversial. In Europe the primary arthropod vectors of zoonotic diseases are ticks, which transmit *Borrelia burgdorferi sensu lato* (the agent of Lyme disease), tick-borne encephalitis virus and louping ill virus between humans, livestock and wildlife. *Ixodes ricinus* ticks and reported tick-borne disease cases are currently increasing in the UK. Theories for this include climate change and increasing host abundance. This study aimed to test how *I. ricinus* tick abundance might be influenced by climate change in Scotland by using altitudinal gradients as a proxy, while also taking into account the effects of hosts, vegetation and weather effects. It was predicted that tick abundance would be higher at lower altitudes (i.e. warmer climates) and increase with host abundance. Surveys were conducted on nine hills in Scotland, all of open moorland habitat. Tick abundance was positively associated with deer abundance, but even after taking this into account, there was a strong negative association of ticks with altitude. This was probably a real climate effect, with temperature (and humidity, i.e. saturation deficit) most likely playing an important role. It could be inferred that ticks may become more abundant at higher altitudes in response to climate warming. This has potential implications for pathogen prevalence such as louping ill virus if tick numbers increase at elevations where competent transmission hosts (red grouse *Lagopus lagopus scoticus* and mountain hares *Lepus timidus*) occur in higher numbers.

**Source:** <http://dx.doi.org/10.1007/s00442-009-1430-x>

### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Meteorological Factors, Precipitation, Temperature

**Temperature:** Fluctuations

#### Geographic Feature:

resource focuses on specific type of geography

Rural, Other Geographical Feature

**Other Geographical Feature :** highlands

# Climate Change and Human Health Literature Portal

## **Geographic Location:**

resource focuses on specific location

Non-United States

**Non-United States:** Europe

**European Region/Country:** European Country

**Other European Country :** Scotland

## **Health Impact:**

specification of health effect or disease related to climate change exposure

Infectious Disease

**Infectious Disease:** Vectorborne Disease

**Vectorborne Disease:** Tick-borne Disease

**Tick-borne Disease:** Other Tick-borne Disease

**Tick-borne Disease (other):** louping ill virus

## **Mitigation/Adaptation:**

mitigation or adaptation strategy is a focus of resource

Adaptation

## **Model/Methodology:**

type of model used or methodology development is a focus of resource

Exposure Change Prediction

## **Resource Type:**

format or standard characteristic of resource

Research Article

## **Timescale:**

time period studied

Time Scale Unspecified

## **Vulnerability/Impact Assessment:**

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content